EXHIBIT 47

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Google

AWBid Evaluation
2017 September

T&S AdSpam/PubQual

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Table of contents

Executive summary

AWBid risk profile

AWBid badness measures

1. AFTR results
2. Spam filtering rates
3. Policy non-compliance rates

Current T&S allocations

Recommended next steps

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Executive summary

Traffic: Badness is high (~40%) and a high amount is leaking (~7%)

Quality: URL level non-compliance is high (21%, 2% egregious) and trending upward.
- *Brand Safety risk is very high*

Staffing: Current T&S investment in AWBid is minimal (~1 FTE, 20 TVCs)

Top Recommendations:
- Short Term
  - Aggressively remove domains sending large volumes of invalid traffic
  - T&S to reprioritize and invest 4 FTE in AWBid, bringing it to the "Low" level of coverage (see Appendix for coverage levels)
- Medium Term
  - Work with AWBid Product and Eng to request 6 more HC to bring T&S to the "Medium" level of coverage
  - Work with PubQual Eng to address Brand Safety risk (See slide 10 for details)

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AWBid risk profile

- AWBid expands AdWords buying to inventory on 3rd-party exchanges that Google does not control.
- AdWords remarketing advertisers are automatically included without opt-in/opt-out control.

Worse than GDN	On par with GDN	Improvement over GDN
- No sell-side enforcement nor dup detection of "publisher" entities - Limited T&S signoff of exchange implementations (during ramp-up) - PLDR enforcement - Same capability but badness is significantly higher than GDN - Current badness-detection approach isn't effective when publishers aren't aware & well-intentioned	- Spam-adjusted pCTR - Post-serve spam filters are in effect - Site-level policy blacklists are in effect	- Pre-bid filters via DBM - BidGuard (coming soon) - Remarketing only*

* AWBid is expanding beyond remarketing, to apps and app-install ads. Additional info here.

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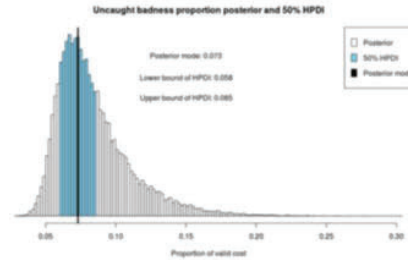| Id	Date	Text
1	10/23/2017 21:43:53	who's advising legally on this?

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1. AFTR results

Stratified sampling that measures badness on ads products, including **revenue-weighted** uncaught Spam & Policy badness.

2017 Q2 - Uncaught Badness

	Spam	Spam+Policy	Policy
AWBid	0.9%	6.1%	N/A*
AFC	0.6%	0.0%	3.6%

Significant Spam+Policy uncaught badness on AWBid, mainly arising from policy violations that cause invalid traffic.

* Policy-only violations (eg: page content) are not yet available, but these may be sizable. See slide on Policy non-compliance rates.

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Id	Date	Text
1	10/26/2017 20:48:30	what's the difference between spam and spam+policy columns?
1	10/26/2017 20:48:30	They're disjoint, ie: spam = invalid traffic only spam+policy = both invalid traffic and policy violation

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2. Spam filtering rates

Advertiser **cost** automatically filtered by AdSpam filters.

	Sep 2017	
	Cost	% Filtered
AWBid	$44M	33%
AFC	$323M	14%
AdX	$681M	11%

In September, AWBid bought $1M+ on 2 exchanges with over 50% filtered cost.

AWBid filtered cost per month

Legend: — AWBid Spam % — AFC Spam % ● AWBid Cost ● AFC Cost

	Sep 2017	
	Cost	% Filtered
OpenX	$9972k	65%
PlatformID	$166k	51%
AdTech	$2391k	43%
PulsePoint	$1129k	32%
Rubicon	$5790k	31%
Pubmatic	$4447k	28%
Lijit/Sovrn	$1010k	27%
United	$440k	25%
Bidswitch	$4878k	19%
Casale	$5166k	16%
Baidu	$11k	16%
Improve	$219k	15%
Adingo	$277k	15%
AppNexus	$7568k	13%
YieldLab	$253k	12%
Microad	$54k	12%

High levels of filtration can indicate additional spam that doesn't get auto-filtered, and/or implementation problems that can result in net negative revenue.

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3. Policy non-compliance rates

Sampled **URLs** that measure GDN policy violations.

	Sep 2017	
	Non-Compliant	Egregious
AWBid	21%	2.2%
AFC	15%	1.3%

Non-compliance rate is ~6pts higher than AFC and increasing month-over-month.

Egregious violations are not decreasing, unlike on AFC.

Considering current brand-safety concerns, this poses significant risk Over the past few months, T&S has received multiple complaints about egregious/unlawful content on AWBid.

AWBid non-compliant URLs per month

— AWBid Non-Compliant %   AFC Non-Compliant %
■ Trendline for AFC Non-Compliant %

AWBid egregious non-compliant URLs per month

— AWBid Egregious %   AFC Egregious %
■ Trendline for AFC Egregious %
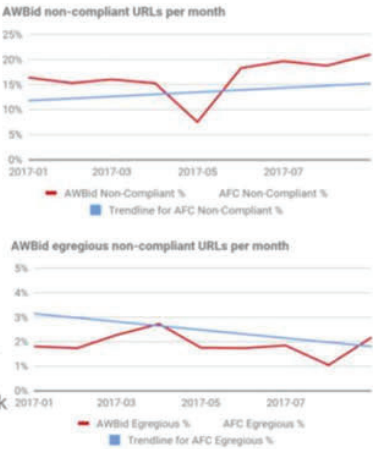
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Current T&S allocations

T&S currently provides exchange ramp-up guidance and only takes a reactive approach to AWBid escalations.

AWBid

- **~1 FTE** across T&S AdSpam/PubQual
  - Approval for 2 FTEs for DBM exchange enforcement/integration
- **20 TVCs*** for URL Policy evaluation & enforcement (funded by T&S)

AFC

- **~28 FTEs** across T&S AdSpam/PubQual

- **~97 TVCs** for URL Policy evaluation on AFC/AdX

To provide medium-level AWBid spam & policy protection, T&S would need to staff a team of up to **10 FTEs and 20 TVCs.****

* This assumes AWBid enforcement will be similar to AFC. As mentioned in the previous slide, badness-detection will likely be more costly on AWBid.

** These estimates assume full web inventory; it could increase as AWBid expands to apps/video.

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Recommended next steps (1 of 2)

Resources:
- T&S to reprioritize and invest in AWBid, bringing it to the "Low" level of coverage
- Work with AWBid Product and Eng to request HC to bring T&S to the "Medium" level of coverage
- Influence AdSpam and PubQual Eng to increase investment on AWBid

Product
- Don't buy on the first bid request - i.e. wait until we have crawled the URL
- Explore making AWBid opt-in OR give advertisers the option to opt-out
- Similar to BidGuard, create a whitelist of top sites/exchanges in order to limit inventory and cut off the tail

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Id	Date	Text
1	10/19/2017 15:49:09	Given the brand risk of AWBid is nearly twice that of AFC, then I think not bidding till the content has been crawled for AWBid inventory would be a option. The push back may be that AWBid is just for remarketing, focusing on users and thus less concerned about brand risk. The impact analysis of skipping uncrawled inventory I did a while ago does not separate AWBid inventory from other network inventory. I'll redo that for a couple of weeks traffic later today.
1	10/19/2017 15:58:15	I like the thought of testing this on AwBid inventory. It's riskier and lest financially critical.
1	10/19/2017 17:50:10	"Don't buy on the first bid request - i.e. wait until we have crawled the URL" - AwBid pages are crawled if and only there are at least 5 impressions per hour. This crawl policy is made based on resource consumption and contextual targeting experiment. Not serving on first impression is not sufficient.
2	10/19/2017 17:59:01	Maybe the way to state the rule is "Serve ads only after the page has been crawled as certified as policy compliant".
2	10/19/2017 18:07:04	Agree. Though the challenge is that we don't have all policy classifiers automated yet. Manual review for scaling does not work realistically. I'm less concerned with increasing the crawl capacity as we just need to get machines.
1	10/19/2017 18:27:15	"Don't buy on the first bid request": This has come up as a general principle in PubQual discussions, not specific to AwBid. Is this a good place to try it out? +scottspencer@google.com +shulei@google.com +zippel@google.com
2	10/19/2017 18:27:15	Only serving after the content is crawled is what I suggested. Preliminary analysis says that 55% of AwB pages are not crawled, but the fraction of impressions on uncrawled is significantly smaller than for the network as a whole.
2	06/26/2018 15:45:29	As of Dec 2017, our TVCs review 360k out of 14B AWBid URLs (~1/40000 or 0.0026%).

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Recommended next steps (2 of 2)

Enforcement and Risk Mitigation:

- Aggressively remove domains sending large volumes of invalid traffic
- Re-tune spam filters to be more effective on AWBid inventory.
- Exchange inventory throttling. If an exchange has a disproportionate number of URLs being demand restricted, we move to a whitelist buying basis for their inventory
- Publisher (bidder ID) aggregation
  - If sufficient number of URLs are demand restricted we stop buying from that bidder ID full stop
  - For new bidder IDs, review a sample of its URLs to determine whether to whitelist and buy from

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Appendix

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Links to additional resources

- go/awbid-escalation-plan
- AwBid Update AdSpam Exec Oct 16
- T&S AWBid Enforcement Matrix
- AWBid Notification: Analysis of spam-filtered domains

- AWBid Expansion
- AFTR 2017 Q2 results
- AFTR Q2 results - AWBid
- AFTR Q2 results - AFCO
- AWBid spam metrics
  - PowerDrill session
- AwBid Expansion PubQual Draft Slide
- T&S AwBid HC request
- Display Product Protection

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Our Request - AdSpam

Coverage	FTE HC	FTE Coverage
High	12	1. Work with product team to identify issues affecting ad traffic resolving these while maintaining exchange level ramp-up support to product - 1 FTE 2. Introduce automatic network coverage for AWBid - 4 FTE 3. Conduct regular traffic sweeps + flagged leads reviews - 5 FTEs 4. Reactive / advertiser escalations - 2 FTE
Medium	7	1. Work with product team to identify issues affecting ad traffic resolving these while maintaining exchange level ramp-up support to product - 1 FTE 2. Introduce automatic network coverage for AWBid - 4 FTE 3. Reactive / advertiser escalations - 2 FTE
Low	3	1. Work with product team to identify issues affecting ad traffic resolving these while maintaining exchange level ramp-up support to product - 1 FTE 2. Reactive / advertiser escalations - 2 FTE

Our Request - Publisher Quality

Coverage	TVC HC	TVC Coverage	FTE HC	FTE Coverage
High	DUB: 12 KL: 12 HYD: 16 **Total: 40**	3,200,000 reviews per year 0.4% URL coverage*	5	4 FTE for ongoing network level review and analysis 1 FTE for new network launch review and analysis
Medium	DUB: 6 KL: 6 HYD: 8 **Total: 20**	1,600,000 reviews per year 0.2% URL coverage*	3	2 FTE for ongoing network level review and analysis 1 FTE for new network launch review and analysis
Low	DUB: 3 KL: 3 HYD: 4 **Total: 10**	800,000 reviews per year 0.1% URL coverage*	1	1 FTE for new network launch review and analysis No ongoing network level reviews

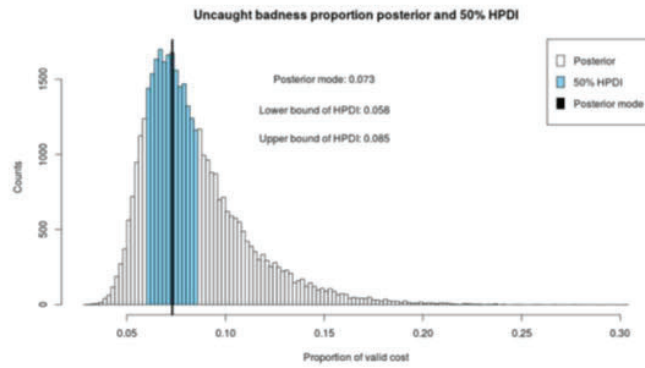<u>Note</u>: PubQual includes FTE and TVC resources

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Id	Date	Text
3	10/05/2017 09:45:08	Can you provide updated numbers then? Thanks. I've also added a caveat to the T&S allocation slide. As I recall, these allocations assumed AWBid would expand to all web-based inventory.
2	10/05/2017 13:28:29	+andrewli@google.com +mauricechan@google.com for app numbers
3	10/05/2017 14:19:49	+henrykim@google.com Are you aware of any documentation into the planned expansion / increase in inventory that I can reference to update the web numbers?
1	10/06/2017 10:04:47	This should increase to reflect new exchange expansion, app expansion etc.
4	10/06/2017 10:04:47	The "AWBid Expansion" linked resource (https://docs.google.com/presentation/d/1I_QdbM6_9X_jTWdnC6JW70I8-CUg6DqBMwJB5op2kjA/edit) mainly describes expansion into apps. Note that the AdSpam numbers assumed all targeting, ie: AWBid would grow to the size of DBM (though that was a year ago).